

7/9/1 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2001 Derwent Info Ltd. All rts. reserv.

013148015 \*\*Image available\*\*  
WPI Acc No: 2000-319887/200028  
XRPX Acc No: N00-240097

Active shield designing for zeroing magnetic field on one side of given boundary by calculating first and second current distributions concurrently and observing constraints such that given magnetic field is achieved in first region

Patent Assignee: PICKER INT INC (PXRM )

Inventor: BROWN R; FUJITA H; MORICH M A; PETROPOULOS L S; SHVARTSMAN S M

Number of Countries: 025 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 992812	A2	20000412	EP 99307585	A	19990927	200028 B

Priority Applications (No Type Date): US 98162005 A 19980928

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

EP 992812 A2 E 62 G01R-033/42

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT  
LI LT LU LV MC MK NL PT RO SE SI

Abstract (Basic): EP 992812 A2

NOVELTY - A first current distribution is constrained to a primary coil. A second current distribution is constrained of the secondary coil. The first and second current distributions are calculated concurrently while observing the constraints such that a set magnetic field is achieved in a first region and a magnetic field on one side of a set boundary is substantially zeroed.

DETAILED DESCRIPTION - A \*\*\*sequence\*\*\* \*\*\*control\*\*\* \*\*\*circuit\*\*\* (40) \*\*\*controls\*\*\* gradient pulse amplifiers (20) and a transmitter (24) to generate any of a number of multiple echo sequences such as echo planar imaging, echo volume imaging, gradient and spin echo imaging, fast spin echo imaging, and the like. For the selected sequence, a receiver (30) receives a number of data lines in rapid succession following each RF excitation pulse. Ultimately, the radio frequency signals received are demodulated and reconstructed into an image representation by a reconstruction processor (50) which applies a two dimensional Fourier transform or other appropriate reconstruction algorithm.

INDEPENDENT CLAIMS are included for:

- (a) a shielded coil;
- (b) a gradient coil assembly; and
- (c) a \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* scanner

USE - In self-shielded magnetic gradient coils used in \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging (\*\*\*MRI\*\*\*) applications.

ADVANTAGE - High quality efficient active shielding of magnetic and/or electric fields is achieved. The method provides an analytical solution to a wide range of shielding applications. High quality magnetic gradients can be achieved in the examination region of an \*\*\*MRI\*\*\* scanner while reducing eddy current effects caused by residual magnetic fields outside the gradient coil assembly.

DESCRIPTION OF DRAWING(S) - The drawing is a diagrammatic illustration of a \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging apparatus including a shielding gradient coil assembly.

Gradient pulse amplifiers (20)  
Transmitter (24)  
Receiver (30)  
\*\*\*Sequence\*\*\* \*\*\*control\*\*\* \*\*\*circuit\*\*\* (40)  
Reconstruction processor (50)  
pp; 62 DwgNo 1a/17  
Title Terms: ACTIVE; SHIELD; DESIGN; ZERO; MAGNETIC; FIELD; ONE; SIDE;  
BOUNDARY; CALCULATE; FIRST; SECOND; CURRENT; DISTRIBUTE; CONCURRENT;  
OBSERVE; CONSTRAIN; MAGNETIC; FIELD; ACHIEVE; FIRST; REGION  
Derwent Class: S01; S03; S05; V02  
International Patent Class (Main): G01R-033/42  
File Segment: EPI  
Manual Codes (EPI/S-X): \*\*\*S01-E02A2\*\*\*; \*\*\*S01-E02A8A\*\*\*; S01-J02;  
\*\*\*S03-E07A\*\*\*; \*\*\*S05-D02B1\*\*\*; V02-F01G; V02-F03X

---

7/9/2 (Item 2 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2001 Derwent Info Ltd. All rts. reserv.

013001832 \*\*Image available\*\*

WPI Acc No: 2000-173684/200016

XRPX Acc No: N00-129348

\*\*\*Magnetic\*\*\* \*\*\*resonance\*\*\* system with particular application in conjunction with diagnostic imaging at surgical sites uses pair of ferrous , Rose rings disposed parallel to each other on opposite sides of imaging volume

Patent Assignee: PICKER INT INC (PXRM )

Inventor: DEMEESTER G D; KINANEN I; MCGINLEY J V M; YOUNG I R

Number of Countries: 027 Number of Patents: 003

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 982598	A2	20000301	EP 99306173	A	19990803	200016 B
JP 2000070238	A	20000307	JP 99231193	A	19990818	200023
US 6218838	B1	20010417	US 98141708	A	19980828	200123

Priority Applications (No Type Date): US 98141708 A 19980828

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
-----------	------	--------	----------	--------------

EP 982598	A2	E	6	G01R-033/38
-----------	----	---	---	-------------

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT  
LI LT LU LV MC MK NL PT RO SE SI

JP 2000070238	A	5	A61B-005/055
---------------	---	---	--------------

US 6218838	B1		G01V-003/00
------------	----	--	-------------

Abstract (Basic): EP 982598 A2

NOVELTY - The system includes Rose ring (26) which focuses magnetic flux improving uniformity and linearity in the imaging volume (12), a shim set (30) including a number of individual magnetized rings (32a-d) surrounded by ferrous rings (14,22) to focus the magnetic flux, make the flux more uniform and correct for harmonic distortion.

DETAILED DESCRIPTION - A non-ferrous support structure (34) supports the magnetized rings as well as the radio frequency coils (40). Gradient coils (50) disposed on opposite side of magnetized rings are located behind the shim set. \*\*\*Sequence\*\*\* \*\*\*control\*\*\* \*\*\*circuit\*\*\* (60) \*\*\*controls\*\*\* gradient coil amplifiers (62) and

transmitter (64) in accordance with preselected \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging sequence to induce MR echoes in tissue or other material in imaging volume. RF receiver (66) receives the induced MR echoes and the MR signals are reconstructed by reconstruction processor (68) using an inverse Fourier transform algorithm into electronic image representation to be stored or displayed on video monitor using video processor.

USE - For diagnostic imaging at surgical sites and will find application in other magnetic imaging, spectroscopy and therapy applications.

ADVANTAGE - MR magnet has high homogeneity, good patient access and low forces on driver coils. Facilitates design of open magnets, and reduction in potential eddy currents and reduced pole mass.

DESCRIPTION OF DRAWING(S) - Drawing shows elevational view in partial section of \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging system according to present invention.

Imaging volume (12)

Annular ferrous ring (14,22)

Rose ring (26)

Shim set (30)

Magnetized iron rings (32a-32d)

Gradient field coils (50)

\*\*\*Sequence\*\*\* \*\*\*control\*\*\* \*\*\*circuit\*\*\* (60)

Gradient coil amplifiers (62)

Transmitter (64)

pp; 6 DwgNo 1/2

Title Terms: MAGNETIC; RESONANCE; SYSTEM; APPLY; CONJUNCTION; DIAGNOSE; IMAGE; SURGICAL; SITE; PAIR; FERROUS; ROSE; RING; DISPOSABLE; PARALLEL; OPPOSED; SIDE; IMAGE; VOLUME

Derwent Class: S01; S03

International Patent Class (Main): A61B-005/055; G01R-033/38; G01V-003/00

International Patent Class (Additional): G01R-033/387

File Segment: EPI

Manual Codes (EPI/S-X): \*\*\*S01-E02A2\*\*\*; \*\*\*S01-E02A8A\*\*\*; S01-E02A8C; S01-E02A8E; S03-E07

---

7/9/3 (Item 3 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

012956428 \*\*Image available\*\*

WPI Acc No: 2000-128278/200012

XRPX Acc No: N00-096693

Configuring a \*\*\*control\*\*\* \*\*\*sequence\*\*\* in an imaging system e.g. medical \*\*\*MRI\*\*\* system

Patent Assignee: GENERAL ELECTRIC CO (GENE )

Inventor: LICATO P E; MCKINNON G C; PLOETZ L E; TAN Q

Number of Countries: 026 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 974881	A2	20000126	EP 99305592	A	19990714	200012 B
JP 2000060822	A	20000229	JP 99206978	A	19990722	200022

Priority Applications (No Type Date): US 98120920 A 19980722

Patent Details:

*Equivalent  
for  
Parent  
Application*

Patent No Kind Lan Pg Main IPC Filing Notes  
EP 974881 A2 E 16 G05B-019/042

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT  
LI LT LU LV MC MK NL PT RO SE SI  
JP 2000060822 A 12 A61B-005/055

Abstract (Basic): EP 974881 A2

NOVELTY - The \*\*\*control\*\*\* \*\*\*sequence\*\*\* configuration involves an imaging system including independently controllable subsystems (56-64) for e.g. pulse and gradient field generation, and \*\*\*control\*\*\* \*\*\*circuitry\*\*\* for \*\*\*commanding\*\*\* activities of the subsystems. The method includes the steps of:

- (i) defining a first logical component module (118) including instructions for executing a first activity (68-76) of at least one subsystem (56-60) and a first time boundary (128) for execution of the first activity;
- (ii) defining a second logical component module (120) including instructions for executing a second activity (80) of at least one subsystem (64) and a second time boundary for execution of the second activity;
- (iii) assembling the first and second logical component modules into a \*\*\*control\*\*\* \*\*\*sequence\*\*\*; and
- (iv) storing the \*\*\*control\*\*\* \*\*\*sequence\*\*\* in a memory \*\*\*circuit\*\*\*.

DETAILED DESCRIPTION - The controllable subsystems are for general control, anchor and RF pulses, and for XYZ gradient fields.

USE - For an imaging system e.g. a medical \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging (\*\*\*MRI\*\*\*) system.

ADVANTAGE - Coordinates and optimizes pulse sequences and other activities such as gradient fields on multiple system axes in a manner which respects the physics of the imaging process and avoids unwanted interactions between the multiple axes.

pp; 16 DwgNo 1/10

Title Terms: CONTROL; SEQUENCE; IMAGE; SYSTEM; MEDICAL; \*\*\*MRI\*\*\*; SYSTEM  
Derwent Class: S01; S03; S05; T06

International Patent Class (Main): A61B-005/055; G05B-019/042

International Patent Class (Additional): G01R-033/48; G01R-033/54;  
G06F-019/00; G06T-001/00

File Segment: EPI

Manual Codes (EPI/S-X): \*\*\*S01-E02A2\*\*\*; \*\*\*S03-E07A\*\*\*; \*\*\*S05-D02B1\*\*\*;  
\*\*\*T06-A04B1\*\*\*

---

7/9/4 (Item 4 from file: 350)  
DIALOG(R) File 350:Derwent WPIX  
(c) 2001 Derwent Info Ltd. All rts. reserv.

012845319 \*\*Image available\*\*  
WPI Acc No: 2000-017151/200002  
XRXPX Acc No: N00-013569

Pulse \*\*\*sequence\*\*\* \*\*\*control\*\*\* arrangement for \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging apparatus - controls supply of clock signal to MPU either from VCO or from standard clock of transmission system, depending on locking condition of PLL

Patent Assignee: HITACHI MEDICAL CORP (HITR )  
Number of Countries: 001 Number of Patents: 001  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 11290292	A	19991026	JP 98112863	A	19980409	200002 B

Priority Applications (No Type Date): JP 98112863 A 19980409

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 11290292	A	7		A61B-005/055	

~~Abstract~~ (Basic): JP 11290292 A

NOVELTY - The output of VCO and standard clock signal is fed to phase synchronization circuit. When there is no supply of clock from transmission system (4) to PLL (35), synchronous clock signal selector (31) selects signal from measurement group of \*\*\*NMR\*\*\* and supplies to MPU (34) and when there is supply of clock, voltage of VCO is \*\*\*controlled\*\*\* so that PLL \*\*\*circuit\*\*\* receives standard clock from transmission system (4). DETAILED DESCRIPTION - The standard clock signal and clock signal generated by VCO are of identical frequency. The frequency divider (32) divides the output signal of VCO (36) and a frequency multiplier (33) generates clock signal whose frequency is integral multiple of output of VCO.

USE - In \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging apparatus for obtaining tomogram from desired portion of human body.

ADVANTAGE - As the supply of clock signals is not concerned with ON/OFF of transmission system power supply, it is not necessary to load software to the degree of ON/OFF of the system and the signals can be supplied with stability to the MPU which inturn stabilizes the operation of MPU. By performing synchronization, the disturbance of the phase of a clock is eliminated. DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of clock generating part of the sequencer. (4) Transmission system; (31) Synchronous clock signal selector; (32) Frequency divider; (33) Frequency multiplier; (34) MPU; (35) PLL; (36) Voltage controlled oscillator.

Dwg.1/5

Title Terms: PULSE; SEQUENCE; CONTROL; ARRANGE; MAGNETIC; RESONANCE; IMAGE; APPARATUS; CONTROL; SUPPLY; CLOCK; SIGNAL; MPU; VCO; STANDARD; CLOCK; TRANSMISSION; SYSTEM; DEPEND; LOCK; CONDITION; PLL

Derwent Class: P31; S01

International Patent Class (Main): A61B-005/055

International Patent Class (Additional): G01R-033/36; G01R-033/48

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): S01-E02A

---

7/9/5 (Item 5 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

012777680 \*\*Image available\*\*

WPI Acc No: 1999-583906/199950

XRPX Acc No: N99-431479

\*\*\*Magnetic\*\*\* \*\*\*resonance\*\*\* imaging apparatus used for high-speed photography - has \*\*\*sequence\*\*\* \*\*\*controller\*\*\* which outputs \*\*\*control\*\*\* signal for operating both delay circuits to respectively supply voltage signal and high voltage signal to adder circuit

Patent Assignee: TOSHIBA KK (TOKE )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 11253419	A	19990921	JP 9859865	A	19980311	199950 B

Priority Applications (No Type Date): JP 9859865 A 19980311

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 11253419	A	6	A61B-005/055	

Abstract (Basic): JP 11253419 A

NOVELTY - A \*\*\*sequence\*\*\* \*\*\*controller\*\*\* (102) outputs a \*\*\*control\*\*\* signal for operating both delay circuits (60,61) to respectively supply a voltage signal (VF) and high voltage signal (VB) to an adder circuit (50). A high voltage circuit (110) serially connected to a gradient magnetic field coil (101) and a low voltage amplifier (200), produces a high voltage depending on the control signal received. DETAILED DESCRIPTION - A \*\*\*controller\*\*\* (80) shorts \*\*\*circuits\*\*\* a resistor (Rcomp) for phase compensation by operating a switch (SWR). The high voltage output is set-up to supply a stable voltage to the gradient magnetic field coil.

USE - Used for high-speed photography.

ADVANTAGE - Obtains equal magnitude for inclination of current command signal and gradient magnetic field current since delay time for both are fixed at predetermined value. DESCRIPTION OF DRAWING(S) - The figure shows the schematic circuit diagram of the low voltage amplifier. (50) Adder circuit; (60,61) Delay \*\*\*circuits\*\*\*; (80) \*\*\*Controller\*\*\*; (101) Gradient magnetic field coil; (102) \*\*\*Sequence\*\*\* \*\*\*controller\*\*\*; (110) Voltage \*\*\*circuit\*\*\*; (200) Low voltage amplifier; (Rcomp) Resistor; (SWR) Switch; (VB) High voltage signal; (VF) Voltage signal.

Dwg.2/5

Title Terms: MAGNETIC; RESONANCE; IMAGE; APPARATUS; HIGH; SPEED; PHOTOGRAPH ; SEQUENCE; CONTROL; OUTPUT; CONTROL; SIGNAL; OPERATE; DELAY; CIRCUIT; RESPECTIVE; SUPPLY; VOLTAGE; SIGNAL; HIGH; VOLTAGE; SIGNAL; ADDER; CIRCUIT

Derwent Class: P31; S01

International Patent Class (Main): A61B-005/055

International Patent Class (Additional): G01R-033/385

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): S01-E02A

---

7/9/6 (Item 6 from file: 350)

DIALOG(R)File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

012335605 \*\*Image available\*\*

WPI Acc No: 1999-141712/199912

XRPX Acc No: N99-103000

Fast spin echo motion artifact reduction type \*\*\*magnetic\*\*\*

\*\*\*resonance\*\*\* imaging system - allows maintenance of inter-echo spacing

Patent Assignee: PICKER INT INC (PXRM )

Inventor: STECKNER C M

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
-----------	------	------	-------------	------	------	------

US 5865747 A 19990202 US 9617355 A 19960426 199912 B  
US 97837704 A 19970422

Priority Applications (No Type Date): US 9617355 A 19960426; US 97837704 A 19970422

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes  
US 5865747 A 7 A61B-005/055 Provisional application US 9617355

Abstract (Basic): US 5865747 A

A magnet generates temporally constant magnetic field through an examination region (14). A transmitter (24) excites dipoles in the examination region such that radio frequency resonance signals are generated. Gradient amplifiers (20) and gradient coils (22) are provided for generating phase and lead magnetic field gradient pulses along orthogonal axes across the examination region. The transmitter and the gradient amplifiers are \*\*\*controlled\*\*\* by a \*\*\*sequence\*\*\* \*\*\*controller\*\*\* (40) to cause excitation followed by echo generation for generating sets of views. The radio frequency \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* signals read during the read gradients are received and demodulated by a receiver (38) to produce the sets of views. A receiver gating \*\*\*circuit\*\*\* connected to the \*\*\*sequence\*\*\* \*\*\*controller\*\*\*, \*\*\*controls\*\*\* the receiver to process even numbered echoes and odd numbered echoes which occur after a threshold number of echoes. A reconstruction processor reconstructs the sets of rows into image representations which are then stored in an image memory.

USE - None given.

ADVANTAGE - Reduces fast spin echo motion artifacts while maintaining inter-echo spacing same as an uncompensated FSE sequence. Reduces gradient demands and eddy current and increases signal to noise ratio. The figure shows the \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging system. Examination region (14), Gradient amplifier (20), Gradient coil (22), Transmitter (24), Receiver (38), \*\*\*Sequence\*\*\* \*\*\*controller\*\*\* (40).

Dwg.1/2

Title Terms: FAST; SPIN; ECHO; MOTION; ARTIFACT; REDUCE; TYPE; MAGNETIC; RESONANCE; IMAGE; SYSTEM; ALLOW; MAINTAIN; INTER; ECHO; SPACE

Derwent Class: P31; S05; W04

International Patent Class (Main): A61B-005/055

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): \*\*\*S05-D02B1\*\*\*; W04-M01F3; W04-P01B

---

7/9/7 (Item 7 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

012232433 \*\*Image available\*\*

WPI Acc No: 1999-038540/199904

XRPX Acc No: N99-029066

T \*\*\*NMR\*\*\* imaging apparatus for blood vessel - has gradient magnetic field unit which sets velocity encode of strength suitable for blood flow velocity while obtaining electrocardiograph

Patent Assignee: SHIMADZU CORP (SHMA )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 10295667	A	19981110	JP 97128118	A	19970430	199904 B

Priority Applications (No Type Date): JP 97128118 A 19970430

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 10295667	A	5		A61B-005/055	

~~Abstract~~ (Basic): JP 10295667 A

The imaging apparatus has a static magnetic field generator (11). A gradient magnetic field unit generates a gradient magnetic field which is superimposed on the static magnetic field. An RF transmitter comprising RF oscillation circuit (31), AM circuit (32) and RF power amplifier (33), is also provided. The RF receiver comprises a preamplifier (41), phase detector (42) and A/D convertor (43).

An electrocardiographic sensor (58) obtains the electrocardiograph. The gradient magnetic field unit performs an automatic setting to velocity encode (VENC) of strength suitable for the blood flow velocity. A \*\*\*sequence\*\*\* \*\*\*controller\*\*\* (52) \*\*\*controls\*\*\* the RF transmitting and RF receiving units. A waveform generator (53) generates pulse for gradient magnetic field which drives a magnetic field \*\*\*control\*\*\* \*\*\*circuit\*\*\* (21).

ADVANTAGE - Produces superior blood vessel image. Reduces manual operation involved.

Dwg.1/3

Title Terms: \*\*\*NMR\*\*\*; IMAGE; APPARATUS; BLOOD; VESSEL; GRADIENT; MAGNETIC ; FIELD; UNIT; SET; VELOCITY; ENCODE; STRENGTH; SUIT; BLOOD; FLOW; VELOCITY; OBTAIN; ECG

Derwent Class: P31; S01; S03; S05

International Patent Class (Main): A61B-005/055

International Patent Class (Additional): A61B-005/0265

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): \*\*\*S01-E02A2\*\*\*; \*\*\*S03-E07A\*\*\*; S05-D01A1; S05-D01B1B; S05-D02B

---

7/9/8 (Item 8 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

011683557 \*\*Image available\*\*

WPI Acc No: 1998-100467/199809

XRPX Acc No: N98-080513

Interactive, stereoscopic \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging system for use with \*\*\*MRI\*\*\* scanner - forming stereoscopic image of object, with modification of imaging signals by interactive \*\*\*control\*\*\* \*\*\*circuit\*\*\* causing modification of display in real or near-real time

Patent Assignee: UNIV ILLINOIS FOUND (UNII )

Inventor: GREGORY C D; LAUTERBUR P C; POTTER C S

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5708359	A	19980113	US 95566970	A	19951204	199809 B

Priority Applications (No Type Date): US 95566970 A 19951204

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes  
US 5708359 A 8 G01V-003/00

Abstract(Basic): US 5708359 A

A \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* signal detector is provided for sensing \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* signals from an object. A pulse \*\*\*sequence\*\*\* \*\*\*control\*\*\* unit \*\*\*controls\*\*\* a slice-selection gradient field. A phase-encoding gradient field unit, a readout gradient field unit, a radio frequency transmitter and a \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* signal detector are also provided. \*\*\*Magnetic\*\*\* \*\*\*resonance\*\*\* signals are thus acquired representing two planar slices or stereo pairs of the object.

An interactive \*\*\*control\*\*\* \*\*\*circuit\*\*\* \*\*\*controls\*\*\* the pulse \*\*\*sequence\*\*\* \*\*\*control\*\*\* unit to modify the \*\*\*MRI\*\*\* signals in real or near real time. A processor processes the signals to construct a stereoscopic image of the object in real or near-real time. The image is then displayed in real or near-real time, with modification of the imaging signals by the interactive \*\*\*control\*\*\* \*\*\*circuit\*\*\* causing a modification of the display in real or near-real time. The \*\*\*control\*\*\* \*\*\*circuit\*\*\* executes a pulse \*\*\*sequence\*\*\* corresponding to a spin-warp, gradient-echo or echo-planar method.

ADVANTAGE - Provides rapid acquisition and display of \*\*\*MR\*\*\* \*\*\*images\*\*\*, and provides visual clues to users to facilitate improved interaction with the object under study.

Dwg.1/3

Title Terms: INTERACT; STEREOSCOPIC; MAGNETIC; RESONANCE; IMAGE; SYSTEM; \*\*\*MRI\*\*\*; SCAN; FORMING; STEREOSCOPIC; IMAGE; OBJECT; MODIFIED; IMAGE; SIGNAL; INTERACT; CONTROL; CIRCUIT; CAUSE; MODIFIED; DISPLAY; REAL; REAL; TIME

Derwent Class: S01; S03; S05; T01

International Patent Class (Main): G01V-003/00

File Segment: EPI

Manual Codes (EPI/S-X): \*\*\*S01-E02A2\*\*\*; \*\*\*S03-E07A\*\*\*; S05-D02B; T01-J10C

---

7/9/9 (Item 9 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

009188222 \*\*Image available\*\*

WPI Acc No: 1992-315661/199238

XRPX Acc No: N92-241552

Continually loadable micro-code store for \*\*\*MRI\*\*\* \*\*\*control\*\*\* \*\*\*sequencers\*\*\* - loading microinstructions into one portion of store while sequencer executes microinstructions out of another portion of store

Patent Assignee: UNIV CALIFORNIA (REGC )

Inventor: HOENNINGER J; ZEILENGA J H

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5144242	A	19920901	US 90571258	A	19900823	199238 B

Priority Applications (No Type Date): US 90571258 A 19900823

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

Abstract (Basic): US 5144242 A

The microcoded \*\*\*NMR\*\*\* pulse sequencer for providing real time \*\*\*NMR\*\*\* system control signals, includes: a writable microcode control store adapted to store micro-instructions. A readout circuit is operatively coupled to read a sequence of micro-instructions from the microcode \*\*\*control\*\*\* store. An output \*\*\*circuit\*\*\* is coupled to receive the micro-instructions read by the readout circuit. This output \*\*\*circuit\*\*\* generating output signals for \*\*\*controlling\*\*\* real time generation of a sequence of \*\*\*NMR\*\*\* pulse stimulations.

A loading circuit is operatively coupled to the \*\*\*control\*\*\* store. The loading \*\*\*circuit\*\*\* effecting loading of micro-instructions into the control store without interrupting the real time generation of the sequence of \*\*\*NMR\*\*\* pulse stimulations.

ADVANTAGE - Decreased memory requirements. Real time control.

Dwg.2/16

Title Terms: CONTINUE; LOAD; MICRO; CODE; STORAGE; \*\*\*MRI\*\*\*; CONTROL; SEQUENCE; LOAD; MICROINSTRUCTION; ONE; PORTION; STORAGE; SEQUENCE; EXECUTE; MICROINSTRUCTION; PORTION; STORAGE

Derwent Class: S01; S03

International Patent Class (Main): G01R-033/20

File Segment: EPI

Manual Codes (EPI/S-X): S01-E02A; S01-H05; \*\*\*S03-E07A\*\*\*

---

7/9/10 (Item 10 from file: 350)

DIALOG(R)File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

008891268 \*\*Image available\*\*

WPI Acc No: 1992-018537/199203

XRPX Acc No: N92-014081

Microcode \*\*\*sequencer\*\*\* \*\*\*controller\*\*\* for \*\*\*NMR\*\*\* imaging - has level sensitive external acting to permit sequences and WAIT instructions to be executed when external gating is desired or not

Patent Assignee: UNIV CALIFORNIA (REGC )

Inventor: HOENNINGER J C

Number of Countries: 003 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
GB 2245992	A	19920115	GB 9017816	A	19900814	199203 B
DE 4036968	A	19920116	DE 4036968	A	19901120	199204
GB 2245992	B	19940202	GB 9017816	A	19900814	199404
US 5291610	A	19940301	US 90551798	A	19900712	199409
US 5481744	A	19960102	US 90551798	A	19900712	199607
			US 93147552	A	19931105	

Priority Applications (No Type Date): US 90551798 A 19900712; US 93147552 A 19931105

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5291610	A	17	G06F-009/00	
US 5481744	A	17	G06F-009/00	Cont of application US 90551798 Cont of patent US 5291610
GB 2245992	B		G05B-015/00	

Abstract (Basic): GB 2245992 A

The \*\*\*sequencer\*\*\* \*\*\*controller\*\*\* includes a level-sensitive external gating arrangement. When a sequencer microcode Wait instruction is executed, the gating arrangement operates differently depending on the level of the signal (176) existing at the external gating input. If the external gating signal level is at one level, the gating arrangement causes the sequencer to wait until the external gating input changes level - thus permitting an external gating event (e.g., closure of a breath switch or the like) to interact with and control the timing of the \*\*\*NMR\*\*\* sequence.

If the external gating signal is at a different level when the Wait instruction is first executed, however, the sequencer does not 'wait' at all but instead ignores the Wait instruction and goes to the next sequencer instruction. Such level sensitive external gating permits microcode sequences including Wait instructions to be executed when external gating is desired and also when external gating is not desired. Thus a separate code for each desire is unnecessary.

USE/ADVANTAGE - Medical use. Sensitive to level (rather than transitions) of external gating signal. (48pp Dwg.No.4/7

Abstract (Equivalent): GB 2245992 B

A method of operating a microcoded \*\*\*control\*\*\* \*\*\*sequencer\*\*\* \*\*\*controlling\*\*\* a nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging system, said sequencer having provided thereto a microcode instruction sequence including at least one microcode instruction encoding a WAIT command, said sequencer receiving an external gating signal, said method comprising the following steps: a) generating clock pulses; b) determining whether a provided microcode instruction encodes said WAIT command; c) testing a level of said external gating signal, d) if said testing step c) reveals that said external gating signal level is at a first predetermined level, ignoring a WAIT command determined by said determining step b), and e) waiting until said external gating signal level changes and a generated clock pulse occurs before executing a further microcode instruction if said determining step b) determines that said provided microwave instruction encodes said WAIT command and said testing step c) reveals said external gating signal is a level that is different from said first predetermined level.

Abstract (Equivalent): US 5481744 A

A nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging system comprising:

at least one magnetic field source that applies a magnetic field to a body;

an RF transmitter for applying RF excitation pulses to said body in response to a first control signal;

an RF receiver that receives, under control of a second control signal, nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* responses generated by said body in response to said RF excitation pulses;

imaging means connected to said RF receiving means for generating an image based on said received responses;

a sequencer for repetitively generating said first and second control signals in real time under control of a program specifying a time sequence of said RF excitation pulses and said response receptions, said program defining at least one WAIT command; and

an external gating circuit connected to said sequencer, said external gating circuit connected to receive an external gate signal, said external gating circuit including a testing circuit for testing said external gate signal to determine whether said signal is at a

predetermined level, said external gating \*\*\*circuit\*\*\* disabling said WAIT \*\*\*command\*\*\* and allowing said sequencer to proceed in said repetitive generating of said first and second \*\*\*control\*\*\* signals when said testing \*\*\*circuit\*\*\* determines said signal is at said predetermined level, said external gating \*\*\*circuit\*\*\* \*\*\*controlling\*\*\* said \*\*\*sequencer\*\*\* to wait in response to the WAIT command until said external gate signal changes level when said testing circuit determines said external gate signal is at a level different from said Predetermined level.

Dwg.2/7

US 5291610 A

The \*\*\*sequencer\*\*\* \*\*\*controller\*\*\* for nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging includes a level-sensitive external gating arrangement. When a sequencer microcode WAIT instruction is executed, the gating arrangement operates differently depending on the level of the signal existing at the external gating input. If the external gating signal level is at one level, the gating arrangement causes the sequencer to wait until the external gating input changes level--thus permitting an external gating event (e.g., closure of a breath switch or the like) to interact with and control the timing of the \*\*\*NMR\*\*\* sequence.

If the external gating signal is at a different level when the WAIT instruction is first executed, however, the sequencer does not "wait" at all but instead ignores the WAIT instruction and goes to the next sequencer state.

USE/ADVANTAGE - Pulse programmer. Level sensitive external gating permits microcode sequences including WAIT instructions to be executed when external gating is desired and also when external gating is not desired, thus reducing amount of code that needs to be maintained.

Dwg.3/7

Title Terms: SEQUENCE; CONTROL; \*\*\*NMR\*\*\*; IMAGE; LEVEL; SENSITIVE; EXTERNAL; ACT; PERMIT; SEQUENCE; WAIT; INSTRUCTION; EXECUTE; EXTERNAL; GATE

Derwent Class: S01; S03; S05; T01

International Patent Class (Main): G05B-015/00

International Patent Class (Additional): G01N-024/08; G01R-033/28; G05B-019/18; G06F-009/44

File Segment: EPI

Manual Codes (EPI/S-X): S01-E02A; S03-E07; S05-D02B; T01-F01

---

7/9/11 (Item 11 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

007665993 \*\*Image available\*\*

WPI Acc No: 1988-299925/198842

XRXPX Acc No: N88-227539

\*\*\*Magnetic\*\*\* \*\*\*resonance\*\*\* imaging appts. for medical diagnosis - includes \*\*\*sequence\*\*\* \*\*\*controller\*\*\* for simultaneous execution of several events, e.g. application of magnetic field gradients to body

Patent Assignee: TOSHIBA KK (TOKE )

Inventor: KIKUCHI N

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
-----------	------	------	-------------	------	------	------

US 4775835 A 19881004 US 8731283 A 19870330 198842 B

Priority Applications (No Type Date): JP 8672911 A 19860331

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes  
US 4775835 A 12

Abstract (Basic): US 4775835 A

The \*\*\*sequence\*\*\* \*\*\*controller\*\*\* includes an event memory for storing a number of data subsets useful for applying magnetic fields and radio frequency (RF) pulses to a body under medical examination. Each data subset contains event data, time data for performing the event data and control data for controlling execution of the event data.

The controller further includes a reference time generator, a comparator for comparing the reference time with the time data sequentially read from the event memory within one reference time period, and a \*\*\*control\*\*\* \*\*\*circuit\*\*\*. The latter sequentially \*\*\*controls\*\*\* an application of the magnetic fields and RF pulses to the body, and data acquisition based upon the event data and control data whenever the time data is coincident with the reference time data judged by the comparator.

ADVANTAGE - High speed \*\*\*sequence\*\*\* \*\*\*controller\*\*\* realised using hardware.

1/6

Title Terms: MAGNETIC; RESONANCE; IMAGE; APPARATUS; MEDICAL; DIAGNOSE; SEQUENCE; CONTROL; SIMULTANEOUS; EXECUTE; EVENT; APPLY; MAGNETIC; FIELD; GRADIENT; BODY

Derwent Class: S01; S02; S03; S05

International Patent Class (Additional): G01R-033/20

File Segment: EPI

Manual Codes (EPI/S-X): S01-E; S01-H05; S02-K03A9; S03-E07; S05-D02A1;  
S05-D02X

---

7/9/12 (Item 12 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

004503594

WPI Acc No: 1986-006938/198601

XRPX Acc No: N86-005030

Nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* imaging system - applies pulse and gradient switching sequence of stimulating signals to test object and combines echoes into data set

Patent Assignee: ADV NMR SYSTEMS INC (ADNM-N)

Inventor: MAUDSLEY A A

Number of Countries: 012 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8505693	A	19851219	WO 85US950	A	19850521	198601 B
EP 182873	A	19860604	EP 85902856	A	19850521	198623

Priority Applications (No Type Date): US 84616283 A 19840601

Cited Patents: US 4297637; US 4390840; US 4431968

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 8505693 A E 42

Designated States (National): JP

Designated States (Regional): AT BE CH DE FR GB IT LU NL SE

EP 182873 A E

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

Abstract (Basic): WO 8505693 A

A programmed digital computer is used to control the pulse and gradient switching \*\*\*sequence\*\*\* from gradient coil \*\*\*control\*\*\* \*\*\*circuits\*\*\* (102a) and RF pulse \*\*\*control\*\*\* \*\*\*circuits\*\*\* (102b). The \*\*\*control\*\*\* program (94a) is stored in computer memory (94). The stimulating signals sequence includes an RF excitation pulse to rotate resonant nuclei in the object through ninety degrees of arc. Then a series of refocussing pulses is applied to rotate the nuclei through 180 degrees of arc.

The sequence provides a series of free induction decay echo signals of which the base line components cancel when the coherent addition program (94b) is effected to combine the sets of echoes into a respective data set in memory (96b). The echo data are Fourier transformed before or after the coherent addition (94b) step. A transform algorithm (94c) is executed finally to derive the image data for display (96c).

USE/ADVANTAGE - For medical diagnosis. Higher contrast is achieved together with shorter data acquisition times by reducing the need for signal averaging.

8/11

Title Terms: NUCLEAR; MAGNETIC; RESONANCE; IMAGE; SYSTEM; APPLY; PULSE; GRADIENT; SWITCH; SEQUENCE; STIMULATING; SIGNAL; TEST; OBJECT; COMBINATION; ECHO; DATA; SET

Index Terms/Additional Words: MEDICAL

Derwent Class: S03; S05

International Patent Class (Additional): G01R-033/08

File Segment: EPI

Manual Codes (EPI/S-X): S03-E07; S05-D02X

---

7/9/13 (Item 1 from file: 347)

DIALOG(R) File 347:JAPIO

(c) 2001 JPO & JAPIO. All rts. reserv.

06348686 \*\*Image available\*\*

\*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\*-IMAGING APPARATUS

PUB. NO.: 11-290292 [JP 11290292 A]

PUBLISHED: October 26, 1999 (19991026)

INVENTOR(s): SAITO YASUMASA

APPLICANT(s): HITACHI MEDICAL CORP

APPL. NO.: 10-112863 [JP 98112863]

FILED: April 09, 1998 (19980409)

INTL CLASS: A61B-005/055; G01R-033/36; G01R-033/48

ABSTRACT

PROBLEM TO BE SOLVED: To stably supply a reference clock and a synchronous clock of a \*\*\*sequencer\*\*\* for \*\*\*controlling\*\*\* the \*\*\*sequence\*\*\* of an \*\*\*MRI\*\*\* apparatus free from the ON or OFF state of a transmission system

power source.

SOLUTION: A clock generation part of a sequencer is provided with a voltage control oscillator(VCO) and PPL(phase synchronization loop) circuit and when no clock is supplied from a transmitting system 4, the voltage control oscillator(VCO) works to supply a clock to an MPU of a sequencer by a self-running frequency. When the supply of the clock proceeds, the PPL \*\*\*circuit\*\*\* \*\*\*controls\*\*\* the voltage of the voltage control oscillator to synchronize a reference clock from the transmitting system 4 and thus, a clock synchronous with the clock of the transmitting system 4 is supplied to the MPU of the sequencer.

COPYRIGHT: (C)1999,JPO

---

7/9/14 (Item 2 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

05960834 \*\*Image available\*\*

\*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\* DIAGNOSTIC DEVICE

PUB. NO.: 10-243934 [JP 10243934 A]  
PUBLISHED: September 14, 1998 (19980914)  
INVENTOR(s): MIURA YOSHIAKI  
APPLICANT(s): SHIMADZU CORP [000199] (A Japanese Company or Corporation),  
JP (Japan)  
APPL. NO.: 09-052825 [JP 9752825]  
FILED: March 07, 1997 (19970307)  
INTL CLASS: [6] A61B-005/055; G01N-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.2 (INSTRUMENTATION --  
Testing)  
JAPIO KEYWORD: R138 (APPLIED ELECTRONICS -- Vertical Magnetic &  
Photomagnetic Recording)

(ABSTRACT)

PROBLEM TO BE SOLVED: To eliminate switching noise generated by a gradient magnetic field power source.

SOLUTION: An RF oscillation circuit 31, a waveform generation circuit 53 and a magnetic field \*\*\*control\*\*\* \*\*\*circuit\*\*\* 21 are synchronously operated by using the operation reference synchronizing clock signals 77 of a system supplied from a \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 52, synchronizing clock signals in which the operation reference synchronizing clock signals 77 are shifted for a reconstitution image band are generated in a synchronizing clock generation circuit 21' inside the gradient magnetic field power source 22 and the switching circuit of the gradient magnetic field power source 22 is operated by the shifted clock signals. Thus, the switching noise is image-formed on the outside of the band of images in reconstitution and the noise is not generated on the images.

---

7/9/15 (Item 3 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

05423265 \*\*Image available\*\*  
NUCLEAR\*\*\*MAGNETIC\*\*\* \*\*\*RESONANCE\*\*\* INSPECTION DEVICE

PUB. NO.: 09-038065 [JP 9038065 A]  
PUBLISHED: February 10, 1997 (19970210)  
INVENTOR(s): MIURA YOSHIAKI  
APPLICANT(s): SHIMADZU CORP [000199] (A Japanese Company or Corporation),  
JP (Japan)  
APPL. NO.: 07-214051 [JP 95214051]  
FILED: July 31, 1995 (19950731)  
INTL CLASS: [6] A61B-005/055; G01R-033/385  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.1 (INSTRUMENTATION --  
Measurement)

ABSTRACT

PROBLEM TO BE SOLVED: To obtain an image without the artifact by carrying out a sequence of gradient magnetic field with reversed polarity, and an image pick-up sequence after selecting the polarity of the gradient magnetic field according to total amount of signal obtained respectively.

SOLUTION: A computer 51 sets data necessary for a \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 52 or a waveform generating circuit 53, manages RF oscillating circuit 31, as well as a preamplifier 41 or a phase detection \*\*\*circuit\*\*\* 42, and \*\*\*controls\*\*\* A/D converter 43. First one excitation pulse is applied and at the same time a pulse of the gradient magnetic field Gz for selecting slice is added, then a pulse of gradient magnetic field Gy for encoding phase and a pulse with reversed gradient magnetic field Gx for readout are added to generate an echo signal. Then the total data amount (total signal intensity) is found, and if the difference is not small, the gradient magnetic field Gz of the polarity having a smaller total data amount is used.

---

7/9/16 (Item 4 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

05133992 \*\*Image available\*\*  
SAT SETTING AND SAT SETTING-SYSTEM

PUB. NO.: 08-089492 [JP 8089492 A]  
PUBLISHED: April 09, 1996 (19960409)  
INVENTOR(s): MIYAZAKI MAKOTO  
MIURA NOBUYUKI  
APPLICANT(s): GE YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or  
Corporation), JP (Japan)  
APPL. NO.: 06-227808 [JP 94227808]  
FILED: September 22, 1994 (19940922)  
INTL CLASS: [6] A61B-005/055; G01R-033/32  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.1 (INSTRUMENTATION --  
Measurement)

ABSTRACT

PURPOSE: To provide a SAT setting system capable of easily setting presaturation by displaying an image as an original image and designating an area to perform presaturation (SAT) on the image by graphically

inputting referring to the displayed image.

CONSTITUTION: In an \*\*\*MRI\*\*\* instrument, a gate modulation \*\*\*circuit\*\*\* 7 is \*\*\*controlled\*\*\* according to a \*\*\*sequence\*\*\* stored in a memory circuit 3, and RF pulses generated at an RF transmitting circuit 6 are modulated to be added to a transmitting coil of a magnet assembly 5 from an RF power amplifier 8. \*\*\*NMR\*\*\* signals obtained at a receiving coil is inputted into a computer 2 via a phase detector 10, an AD transformer 11, etc., to display a rearranged image on a display 12. This system is composed so that a graphic SAT button on the display screen can be operated by operation of a mouse, a track ball, etc., on an operation table 13 to move into the input mode of the graphic SAT by SAT button operation.

---

7/9/17 (Item 5 from file: 347)

DIALOG(R) File 347:JAPIO

(c) 2001 JPO & JAPIO. All rts. reserv.

04885466 \*\*Image available\*\*

\*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\*-DIAGNOSTIC SYSTEM

PUB. NO.: 07-178066 [JP 7178066 A]

PUBLISHED: July 18, 1995 (19950718)

INVENTOR(s): HINO MASAAKI

APPLICANT(s): TOSHIBA CORP [000307] (A Japanese Company or Corporation), JP  
(Japan)

APPL. NO.: 05-325523 [JP 93325523]

FILED: December 24, 1993 (19931224)

INTL CLASS: [6] A61B-005/055

JAPIO CLASS: 28.2 (SANITATION -- Medical)

(ABSTRACT)

PURPOSE: To carry out a sequence after the stopping continuously when the photographing is stopped on the way, by composing memories to store the timing data of the pulse sequence and the waveform data separately, in independent two memories, respectively.

CONSTITUTION: The operation timing of an inclined magnetic field power source, a transmitter circuit system, and a receiver \*\*\*circuit\*\*\* system, are \*\*\*controlled\*\*\* by a \*\*\*sequencer\*\*\*, and the \*\*\*sequencer\*\*\* is \*\*\*controlled\*\*\* by a computer system which consists of a CPU 21, a timing data memory 22, and a waveform data memory 23. In such a system, the timing data memory 22 is composed of a loop form event table 24 to output the same contents several times repeatedly, and a controller 25 to output the timing data along the memory contents. The waveform data memory 23 is composed of a ring buffer 26 which can output the contents of the sequence imaginarily and endlessly and a controller 27 to output the output of the ring buffer 26 coincidently with the timing from the memory 22.

---

7/9/18 (Item 6 from file: 347)

DIALOG(R) File 347:JAPIO

(c) 2001 JPO & JAPIO. All rts. reserv.

04787345 \*\*Image available\*\*

\*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\*-DIAGNOSIS APPARATUS

PUB. NO.: 07-079945 [JP 7079945 A]  
PUBLISHED: March 28, 1995 (19950328)  
INVENTOR(s): ISHIHARA YASUTOSHI  
SATO KOZO  
APPLICANT(s): TOSHIBA CORP [000307] (A Japanese Company or Corporation), JP  
(Japan)  
APPL. NO.: 05-229310 [JP 93229310]  
FILED: September 14, 1993 (19930914)  
INTL CLASS: [6] A61B-005/055; G01N-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.2 (INSTRUMENTATION --  
Testing)

ABSTRACT

PURPOSE: To enable a data collecting time to be reduced and a magnetostatic field magnet to be miniaturized by sliding a bed on which a subject is put when image information is collected.

CONSTITUTION: A bed driving \*\*\*circuit\*\*\* 22 is \*\*\*controlled\*\*\* by a CPU/memory 19 and a \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 20 and a bed 21 is slid for a period of time during which image data is collected, thereby sequentially obtaining data at a predetermined position of a subject. Since image information is collected while sliding the bed 21, a thin magnet can be used as a main magnet 10. Thus, an operability when a treatment for a patient is performed in parallel can be improved, a sense of oppression for the patient can be reduced and the collecting time can be also reduced since spatial image data is collected by sliding the bed in the body axis s direction.

---

7/9/19 (Item 7 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

04561848 \*\*Image available\*\*  
\*\*\*MRI\*\*\* SYSTEM

PUB. NO.: 06-233748 [JP 6233748 A]  
PUBLISHED: August 23, 1994 (19940823)  
INVENTOR(s): KOSUGI SUSUMU  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or  
Corporation), JP (Japan)  
APPL. NO.: 05-022509 [JP 9322509]  
FILED: February 10, 1993 (19930210)  
INTL CLASS: [5] A61B-005/055; G01R-033/46  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.1 (INSTRUMENTATION --  
Measurement)  
JOURNAL: Section: C, Section No. 1276, Vol. 18, No. 610, Pg. 70,  
November 21, 1994 (19941121)

ABSTRACT

PURPOSE: To calculate the optimum waveform of an RF pulse by adding DC offset to a sin waveform to make the profile center of a slice flat and adding cos offset at a specified value to remove the side lobe of the slice.

CONSTITUTION: This device is provided with a DC offset means for adding the

DC offset of offdc to the sin waveform of  $\sin(2\pi \cdot a \cdot t/T)/(2\pi \cdot a \cdot t/T)$  of the RF pulse so as to make the profile center of the slice flat and a cos offset means for adding the cos offset of offc1.cos(2π.(at+alpha).t/T) (.alpha. is 1 or a coefficient approximate to 1) to the sin waveform so as to remove the side lobe of the profile of the slice. The parameter, offdc, offc1 and .alpha. of this calculation is actually measured. Then, a computer 2, \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 3 and gate modulating \*\*\*circuit\*\*\* 7 are corresponding to the DC offset means and the cos offset means.

---

7/9/20 (Item 8 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

04435000 \*\*Image available\*\*

IMAGE DISPLAY METHOD IN \*\*\*MR\*\*\* \*\*\*IMAGE\*\*\* PICKUP

PUB. NO.: 06-078900 [JP 6078900 A]  
PUBLISHED: March 22, 1994 (19940322)  
INVENTOR(s): YOSHITOME EIJI  
IKEZAKI YOSHIKAZU  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 03-041658 [JP 9141658]  
FILED: March 07, 1991 (19910307)  
INTL CLASS: [5] A61B-005/055; G01R-033/28; G01P-013/00; G06F-015/62  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 45.4 (INFORMATION PROCESSING -- Computer Applications); 46.1 (INSTRUMENTATION -- Measurement)  
JOURNAL: Section: C, Section No. 1216, Vol. 18, No. 334, Pg. 78, June 24, 1994 (19940624)

ABSTRACT

PURPOSE: To obtain a flow velocity, spin density and flow direction by displaying images in accordance with the imaginary number part of the complex number subtraction between two sheets of complex number image data.

CONSTITUTION: A \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 3 operates a magnetic field driving circuit 4 in accordance with stored sequence and generates a static magnetic field and a gradient magnetic field by a magnetic field coil of a magnet assembly 5. The RF signal generated in an RF oscillation \*\*\*circuit\*\*\* 6 is modulated by \*\*\*controlling\*\*\* a modulating \*\*\*circuit\*\*\* 7 and is applied from an RF power amplifier 8 to the signal transmission coil of a magnet assembly 5. The resulted \*\*\*NMR\*\*\* signal is inputted via a preamplifier 9 to a phase detector 10 and is inputted via an AD converter 11 to a calculator 2. Two sheets of the complex number image data are obtained by two times of the measurement changing at least one of the gradient magnetic field, the time for impression of the magnetic field and the time when the magnetic field is impressed. The complex number subtraction during this time is executed. The image is displayed in accordance with the data of the imaginary number part obtained by taking only the imaginary number out of the results thereof. The image including the information on all of the flow velocity, flow direction and spin density of the blood is displayed.

---

7/9/21 (Item 9 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

04403114 \*\*Image available\*\*

IMAGING-METHOD BY MR

PUB. NO.: 06-047014 [JP 6047014 A]  
PUBLISHED: February 22, 1994 (19940222)  
INVENTOR(s): TSUKAMOTO TETSUJI  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 04-204974 [JP 92204974]  
FILED: July 31, 1992 (19920731)  
INTL CLASS: [5] A61B-005/055; G01R-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.1 (INSTRUMENTATION -- Measurement)  
JOURNAL: Section: C, Section No. 1204, Vol. 18, No. 276, Pg. 24, May 26, 1994 (19940526)

(ABSTRACT)

PURPOSE: To obtain a diffusion emphasizing image having quantitativeness by executing an arithmetic processing for eliminating the influence of T1 relaxation (time constant of longitudinal relaxation) in a spoiling period, and the influence of an eddy current generated by a diffusion emphasizing gradient magnetic field.

CONSTITUTION: By a \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 3, a gradient magnetic field driving circuit 4 is operated and a static magnetic field and a gradient magnetic field are generated in a magnet assembly 5. Also, a gate modulating \*\*\*circuit\*\*\* 7 is \*\*\*controlled\*\*\*, an RF pulse is modulated to a prescribed waveform and applied to a transmission coil of the magnet assembly 5, an \*\*\*NMR\*\*\* signal obtained by a resin coil is inputted to a computer 2 through a phase detector 10 and thus an image is reconstituted. Subsequently, at the time of reconstituting the image by this computer 2, data containing only the influence of T1 relaxation in a spoiling period, and data containing the influence of diffusion information and an eddy current superposed thereto and the influence of longitudinal relaxation in the spoiling period, etc., are collected and by executing an arithmetic processing of each data thereof, a diffusion emphasizing image is obtained.

---

7/9/22 (Item 10 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

03947345 \*\*Image available\*\*

\*\*\*MR\*\*\* \*\*\*IMAGING\*\*\* METHOD

PUB. NO.: 04-312445 [JP 4312445 A]  
PUBLISHED: November 04, 1992 (19921104)  
INVENTOR(s): YOSHITOME EIJI  
TSUKAMOTO TETSUJI  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 03-079056 [JP 9179056]

FILED: April 11, 1991 (19910411)  
INTL CLASS: [5] A61B-005/055; G01R-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.1 (INSTRUMENTATION -- Measurement)  
JOURNAL: Section: C, Section No. 1038, Vol. 17, No. 142, Pg. 74, March 23, 1993 (19930323)

ABSTRACT

PURPOSE: To provide an image with a clear contour of organs, reduce the signal strength of a mesentery, and make the surrounding organs conspicuous.

CONSTITUTION: A computer 2 controls the whole based on the instruction from an operator console 13. A \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 3 operates a magnetic field driving circuit 4 based on the stored sequence and generates the static magnetic field and gradient magnetic field via the static magnetic field coil and gradient magnetic field coil of a magnet assembly 5. It \*\*\*controls\*\*\* a modulating \*\*\*circuit\*\*\* 7 to modulate the RF signal generated by an RF oscillating circuit 6 into the preset wave-form and apply the RF signal to the transmitting coil of the magnet assembly 5 through an RF power amplifier 8. The computer 2 reorganizes the image based on the data of the \*\*\*NMR\*\*\* signal obtained from an A/D converter 11 and displays it on a display device 12. The interval between the 90 deg. -pulse and the 180 deg. -pulse is staggered by the preset time from TE/2 for the method to collect the \*\*\*NMR\*\*\* signal.

---

7/9/23 (Item 11 from file: 347)  
DIALOG(R) File 347: JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

03279627 \*\*Image available\*\*  
\*\*\*MAGNETIC\*\*\* \*\*\*RESONANCE\*\*\* IMAGE PHOTOGRAPHING DEVICE

PUB. NO.: 02-255127 [JP 2255127 A]  
PUBLISHED: October 15, 1990 (19901015)  
INVENTOR(s): HOSHINO KAZUYA  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 01-079145 [JP 8979145]  
FILED: March 30, 1989 (19890330)  
INTL CLASS: [5] A61B-005/055; G01R-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical)  
JOURNAL: Section: C, Section No. 792, Vol. 14, No. 582, Pg. 132, December 26, 1990 (19901226)

ABSTRACT

PURPOSE: To reduce the influence caused by the noise of a specific frequency by varying the static magnetic field strength by controlling a static magnetic field strength variable means, simultaneously, varying an RF generation frequency by synchronizing with the variation of the static magnetic field strength and simultaneously controlling an RF generating means.

CONSTITUTION: By operating an operating console 2, a static magnetic field power current and its variation range, the frequency of an RF pulse and its

variation range, pulse width, etc., are set, and a signal based on the set value is inputted with a computer 7. A \*\*\*sequence\*\*\* \*\*\*controller\*\*\* 6 \*\*\*controls\*\*\* a gradient magnetic field power source 3 and allows it to generate the gradient magnetic field of a prescribed pulse \*\*\*sequence\*\*\*, and also, \*\*\*controls\*\*\* a gate modulating \*\*\*circuit\*\*\* 8. The gate modulating circuit 8 modulates an RF signal oscillated and outputted with an RF oscillating circuit 9 to the signal of the set frequency and pulse width, amplifies this RF pulse to be modulated in an RF power amplifier 4, and resonates specific atomic nucleus together with a gradient magnetic field given to each axis by the gradient magnetic field power source 3 in a magnet assembly 1.

---

7/9/24 (Item 12 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

03259243 \*\*Image available\*\*

CSF PHOTOGRAPHING METHOD

PUB. NO.: 02-234743 [JP 2234743 A]  
PUBLISHED: September 17, 1990 (19900917)  
INVENTOR(s): MITOBE KATSUHIKO  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 01-055605 [JP 8955605]  
FILED: March 08, 1989 (19890308)  
INTL CLASS: [5] A61B-005/055; G01R-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical)  
JOURNAL: Section: C, Section No. 785, Vol. 14, No. 548, Pg. 78,  
December 05, 1990 (19901205)

ABSTRACT

PURPOSE: To prevent the occurrence of arch fact due to the flow of CSF and body movement and to photograph CSF angiography in a short time by a method wherein the pulse repeating time of a CE-FAST pulse sequence satisfies a specified condition, and the gradient waveform of the CE-FAST pulse sequence is deformed.

CONSTITUTION: A \*\*\*sequence\*\*\* memory \*\*\*circuit\*\*\* 6 \*\*\*controls\*\*\* a gate demodulating \*\*\*circuit\*\*\* 8 according to a \*\*\*command\*\*\* from a calculator 7, and applies an RF pulse signal from an RF power amplifier 4 to an RF transmission coil. The \*\*\*sequence\*\*\* memory \*\*\*circuit\*\*\* 6 \*\*\*controls\*\*\* a gradient magnetic field drive circuit 3 by means of a sequence signal generated based on CE-FAST to feed a gradient magnetic field to three axes of an X-, a Y-, and a Z-axis. A pulse repeating time TR of a CE-FAST pulse sequence satisfies a formula of  $T2M < TR < T2CSF$ . Before or after an \*\*\*NMR\*\*\* signal is detected or approximately at the same time as a time when the \*\*\*NMR\*\*\* signal is detected, the gradient waveform of the CE-FAST pulse sequence is deformed, and the flow of CSF and a phase shift due to body movement are reduced to zero. In the formula, T2M is a lateral relaxation time of tissue except CSF, and T2CSF is the lateral relaxation time T2 of CSF.

---

7/9/25 (Item 13 from file: 347)

DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

03249240 \*\*Image available\*\*  
\*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\* IMAGE PHOTOGRAPHING DEVICE

PUB. NO.: 02-224740 [JP 2224740 A]  
PUBLISHED: September 06, 1990 (19900906)  
INVENTOR(s): HOSHINO KAZUYA  
OTA MASAHIRO  
TSUJII YOSHIKI  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 01-048180 [JP 8948180]  
FILED: February 28, 1989 (19890228)  
INTL CLASS: [5] A61B-005/055; G01R-033/48  
JAPIO CLASS: 28.2 (SANITATION -- Medical)  
JOURNAL: Section: C, Section No. 781, Vol. 14, No. 535, Pg. 86, November 26, 1990 (19901126)

ABSTRACT

PURPOSE: To obtain image data of an arbitrary heart beat phase relative to motion of a heart by presuming the delay time from the reference wave of electrocardiographic signal of pulsation signal, generating trigger by this pulsation signal, changing over the amount of phase encoding, presuming the time obtained by subtracting the delay time from the trigger as the point of time of the reference wave of the electrocardiographic signal, and by determining desired heart beat phase point on the basis of the reference wave.

CONSTITUTION: Ripple wave 41 is sensed by a ripple wave sensing circuit 35 with the phase delayed in an amount corresponding to the transmitting time, because a ripple wave sensing point is apart from the heart. The desired range of heart beat phases is entered into a computer 27 by an operational console 32 as specifying. This computer 27 generates control signals on the basis of the set value, and a \*\*\*sequence\*\*\* memory \*\*\*circuit\*\*\* 26 \*\*\*controls\*\*\* a slope magnetic field driver circuit 23 and a gate modulation circuit 28, and scan is starts with a trigger prepared in the sequence of cine scan on the basis of the ripple signals. Echo signals collected by the sequence of cine scan is amplified by a preamplifier 25, detected by a phase detector 30, and converted by an AD converter 31 into digital signals to be entered in the computer 27.

---

7/9/26 (Item 14 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

02771047 \*\*Image available\*\*  
METHOD AND APPARATUS FOR OBTAINING \*\*\*MAGNETIC\*\*\* \*\*\*RESONANCE\*\*\* SIGNAL

PUB. NO.: 01-068647 [JP 1068647 A]  
PUBLISHED: March 14, 1989 (19890314)  
INVENTOR(s): YODA KIYOSHI  
APPLICANT(s): MITSUBISHI ELECTRIC CORP [000601] (A Japanese Company or Corporation), JP (Japan)

APPL. NO.: 62-225339 [JP 87225339]  
FILED: September 10, 1987 (19870910)  
INTL CLASS: [4] G01N-024/02; A61B-010/00  
JAPIO CLASS: 46.2 (INSTRUMENTATION -- Testing); 28.2 (SANITATION -- Medical)  
JOURNAL: Section: P, Section No. 891, Vol. 13, No. 279, Pg. 127, June 27, 1989 (19890627)

ABSTRACT

PURPOSE: To automatically determine the number of addition times in order to obtain prescribed SN by providing a means for measuring the Q value of a high-frequency coil at the time of no load and at the time of installation of an object to be inspected, means for calculating the SN of a reception signal and means for determining the number of addition times of the reception signal.

CONSTITUTION: The high-frequency coil 4 is subjected to frequency sweeping at the time of no load and the generated magnetic field intensity is detected by a small-sized coil 13. The output voltage of said coil is inputted via an amplifier 14 to a calculator 11. The calculator 11 measures the Q value and sensitivity index of the coil 4 at the time of no load from said voltage. The Q value of the coil 4 at the time of installation of the object to be inspected is then measured and the SN of the reception signal obtained from the coil 4 is calculated by using the prescribed equation. The required and sufficient number of addition times of the reception signal is further calculated from the SN in order to obtain the satisfactory SN of the signal. The number of addition times determined in such a manner is automatically transferred to a \*\*\*sequence\*\*\* \*\*\*control\*\*\* \*\*\*circuit\*\*\*. The number of addition times is thereby automatically and efficiently determined.

---

7/9/27 (Item 15 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

02764541 \*\*Image available\*\*  
\*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\* IMAGING METHOD AND ITS APPARATUS→

PUB. NO.: 01-062141 [JP 1062141 A]  
PUBLISHED: March 08, 1989 (19890308)  
INVENTOR(s): YODA KIYOSHI  
APPLICANT(s): MITSUBISHI ELECTRIC CORP [000601] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 62-217921 [JP 87217921]  
FILED: September 02, 1987 (19870902)  
INTL CLASS: [4] A61B-010/00; G01N-024/02  
JAPIO CLASS: 28.2 (SANITATION -- Medical); 46.2 (INSTRUMENTATION -- Testing)  
JOURNAL: Section: C, Section No. 607, Vol. 13, No. 260, Pg. 73, June 15, 1989 (19890615)

ABSTRACT

PURPOSE: To determine the addition number of a \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* signals times necessary and sufficient for obtaining an image having a predetermined S/N ratio, by providing four steps for

measuring the Q-value Qu and sensitivity index .eta.u of a high frequency coil at the time of non-load, for measuring the Q-value QL at the time of the insertion of an object to be examined, for calculating the S/N ratio .psi. of an image and for determining the addition number of times of a \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* signals.

CONSTITUTION: When a high frequency coil 10 is driven in a non-load state while frequency is swept, induced electromotive force is generated in a small high frequency coil 11 to obtain output voltage V, while a computer 30 calculates the Q-value Qu of the high frequency coil 10. The high frequency magnetic field intensity B generated in the high frequency coil 10 is detected by the small high frequency coil 11 to be inputted to the computer 30 through a high frequency receiver 12, and the sensitivity index .eta.u of the high frequency coil 10 is calculated to measure the Q-value Qu and the sensitivity index .eta.u. In the same way, the Q-value QL of the high frequency coil 10 at the time of the insertion of an object to be examined and the addition number of times are set to N=1 to calculate the S/N ratio .psi.(sub 1) of an image and, next, the addition number of times N necessary and sufficient for obtaining the S/N ratio .psi.\* of a satisfactory image are calculated to be automatically transmitted to a \*\*\*sequence\*\*\* \*\*\*control\*\*\* \*\*\*circuit\*\*\* 2.

---

7/9/28 (Item 16 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

02186655 \*\*Image available\*\*

~~\*\*\*NMR\*\*\* IMAGING APPARATUS~~

PUB. NO.: 62-103555 [JP 62103555 A]  
PUBLISHED: May 14, 1987 (19870514)  
INVENTOR(s): HOSHINO KAZUYA  
APPLICANT(s): YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 60-244820 [JP 85244820]  
FILED: October 31, 1985 (19851031)  
INTL CLASS: [4] G01N-024/08; A61B-010/00  
JAPIO CLASS: 46.2 (INSTRUMENTATION -- Testing); 28.2 (SANITATION -- Medical)  
JOURNAL: Section: P, Section No. 625, Vol. 11, No. 311, Pg. 163,  
October 12, 1987 (19871012)

ABSTRACT

PURPOSE: To enable the reduction in scanning time without lowering quality such as contrast resolving power and spatial resolutions, by selecting the scan sequence according to the level of a spatial frequency.

CONSTITUTION: A \*\*\*sequence\*\*\* memory \*\*\*circuit\*\*\* 10 \*\*\*controls\*\*\* a gate modulation \*\*\*circuit\*\*\* 6 in a desired view according to a command from a calculator 13 to apply a high frequency pulse signal from an RF power amplifier 4 to an RF transmitting coil. The \*\*\*circuit\*\*\* 10 also \*\*\*controls\*\*\* a gradient magnetic field driving circuit 3, the circuit 6 and an A/D converter 11. A phase detector 8 detects a nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* (\*\*\*NMR\*\*\* ) signal being sent through an amplifier 5 with the output of an RF scinillator circuit 7 used as reference signal to be fed to the converter 11. The converter 11 converts

the \*\*\*NMR\*\*\* signal obtained through the detector 8 into digital from analog to be inputted into the calculator 13. The calculator 13 switches the operation of the circuit 10 and a memory and performs a computation using data from the converter 11 to reconstruct the distribution of information on resonance energy to an image while displaying 9 a reconstructed image data.

---

7/9/29 (Item 17 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

02091146 \*\*Image available\*\*

METHOD FOR MEASURING NUCLEAR \*\*\*MAGNETIC\*\*\*-\*\*\*RESONANCE\*\*\* SIGNAL

PUB. NO.: 62-008046 [JP 62008046 A]  
PUBLISHED: January 16, 1987 (19870116)  
INVENTOR(s): HOSHINO KAZUYA  
YOSHITOME EIJI  
MATSUURA HIROYUKI  
APPLICANT(s): YOKOGAWA ELECTRIC CORP [000650] (A Japanese Company or Corporation), JP (Japan)  
YOKOGAWA MEDICAL SYST LTD [485515] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 60-147034 [JP 85147034]  
FILED: July 04, 1985 (19850704)  
INTL CLASS: [4] G01N-024/08; A61B-010/00  
JAPIO CLASS: 46.2 (INSTRUMENTATION -- Testing); 28.2 (SANITATION -- Medical)  
JOURNAL: Section: P, Section No. 584, Vol. 11, No. 178, Pg. 19, June 09, 1987 (19870609)

ABSTRACT

PURPOSE: To easily calculate the accurate position of the DC component of a free induction decrement (FID) and the accurate amplitude of data in the vicinity of DC, prior to applying a gradient magnetic field for a reading gradient, by applying a gradient having a code opposite to that of the magnetic field for an appropriate time.

CONSTITUTION: Prior to FID observation, a reading gradient is applied to an opposite direction only in slight quantity. By this sequence, a FID signal can be observed slightly before a time origin and the time origin can be decided as the peak of the signal. If  $\Delta T$  is set to proper length, the disturbance of the signal due to the rising of a gradient is also received in this time and a signal with accurate amplitude can be observed.  $\Delta T$  is different at every apparatus but may be several hundred micro-seconds-several mili-seconds and the increase in a signal observing time due to this can be neglected. This sequence is stored in a memory circuit and a gradient magnetic field driving \*\*\*circuit\*\*\* is \*\*\*controlled\*\*\* by said \*\*\*sequence\*\*\* and the application of a gradient magnetic field can be achieved.

---

7/9/30 (Item 18 from file: 347)  
DIALOG(R) File 347:JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

01649838 \*\*Image available\*\*  
WAVEFORM GENERATING DEVICE FOR \*\*\*NMR\*\*\* DEVICE

PUB. NO.: 60-128338 [JP 60128338 A]  
PUBLISHED: July 09, 1985 (19850709)  
INVENTOR(s): MATSUURA HIROYUKI  
APPLICANT(s): YOKOGAWA HOKUSHIN ELECTRIC CORP [000650] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 58-237085 [JP 83237085]  
FILED: December 15, 1983 (19831215)  
INTL CLASS: [4] G01N-024/02; G01R-033/22; A61B-010/00  
JAPIO CLASS: 46.2 (INSTRUMENTATION -- Testing); 28.2 (SANITATION -- Medical); 46.1 (INSTRUMENTATION -- Measurement)  
JOURNAL: Section: P, Section No. 405, Vol. 09, No. 289, Pg. 100, November 15, 1985 (19851115)

ABSTRACT

PURPOSE: To output optional analog and digital waveforms and \*\*\*control\*\*\* a \*\*\*sequence\*\*\* at a high speed by providing private hardware such as a waveform storage memory.

CONSTITUTION: Waveform data on an X, a Y, and a Z gradient signal and a modulated signal sent from a computer are written in memories 22, 25, 28 and 31 by a write \*\*\*control\*\*\* \*\*\*circuit\*\*\* 21. Transmitting and receiving \*\*\*circuit\*\*\* \*\*\*control\*\*\* signals from the write \*\*\*control\*\*\* \*\*\*circuit\*\*\* 21 are written in waveform storage memories 34, 36, and 38. The read order of the waveform storage memories 22, 25, 28, 31, 34, 36, and 38 is stored in an order storage memory 100. A read \*\*\*control\*\*\* \*\*\*circuit\*\*\* 41 reads the contents of said respective storage memories to latch circuits 23, 26, 29, 32, 35, 27, and 39 with a start \*\*\*command\*\*\* from a \*\*\*control\*\*\* \*\*\*circuit\*\*\* 102. A memory address register 40 designates write/read addresses which are summed up successively from said write/read \*\*\*control\*\*\* \*\*\*circuits\*\*\* 21 and 41.

---

7/9/31 (Item 19 from file: 347)  
DIALOG(R) File 347: JAPIO  
(c) 2001 JPO & JAPIO. All rts. reserv.

01457608 \*\*Image available\*\*

WAVEFORM GENERATOR FOR \*\*\*NMR\*\*\* DEVICE

PUB. NO.: 59-169208 [JP 59169208 A]  
PUBLISHED: September 25, 1984 (19840925)  
INVENTOR(s): MATSUURA HIROYUKI  
IWAOKA HIDETO  
FUJINO KENJI  
APPLICANT(s): YOKOGAWA HOKUSHIN ELECTRIC CORP [000650] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 58-043767 [JP 8343767]  
FILED: March 16, 1983 (19830316)  
INTL CLASS: [3] H03B-001/00; G01N-024/02  
JAPIO CLASS: 42.4 (ELECTRONICS -- Basic Circuits); 46.2 (INSTRUMENTATION -- Testing)  
JOURNAL: Section: E, Section No. 293, Vol. 09, No. 23, Pg. 77, January 30, 1985 (19850130)

**ABSTRACT**

PURPOSE: To obtain a waveform generator for \*\*\*NMR\*\*\* (nuclear \*\*\*magnetic\*\*\* \*\*\*resonance\*\*\* ) device with which a high-speed control is possible and the \*\*\*control\*\*\* \*\*\*sequence\*\*\* or analog waveform can be simply changed, by using plural waveform memories and writing and reading \*\*\*control\*\*\* \*\*\*circuits\*\*\*.

CONSTITUTION: A writing \*\*\*control\*\*\* \*\*\*circuit\*\*\* 21 writes the data given from a computer to waveform memories 22, 25, 28, 31, 34, 36 and 38 respectively. That is, the grade magnetic field signals (x), (y) and (z) and the waveform data on modulated signals are written to the memories 22, 25, 28 and 31. While the data on the \*\*\*control\*\*\* \*\*\*circuit\*\*\* for transmitting \*\*\*circuit\*\*\*, i.e. an A/D conversion signal, the control signal for transmitting gate, and the control signal for receiving gate are written to the memories 34, 36 and 38 respectively. A reading \*\*\*control\*\*\* \*\*\*circuit\*\*\* 41 reads out the contents of said waveform memories. In such a constitution, a high-speed control is possible and at the same time the \*\*\*control\*\*\* \*\*\*sequence\*\*\* or the analog waveform can be simply changed. Thus such a highly flexible waveform generator is obtained for \*\*\*NMR\*\*\* device.

16/9/1 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2001 Derwent Info Ltd. All rts. reserv.

010314169 \*\*Image available\*\*

WPI Acc No: 1995-215427/199528

XRPX Acc No: N95-168905

Switch-mode power supply for bridged linear amplifier - uses pulse width modulated switch-mode power converters in parallel, connected to DC power supply, and each tracking power demand

Patent Assignee: CROWN INT INC (CROW-N)

Inventor: STANLEY G R

Number of Countries: 062 Number of Patents: 018

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9515612	A1	19950608	WO 94US10690	A	19940921	199528	B
AU 9478767	A	19950619	AU 9478767	A	19940921	199540	
US 5513094	A	19960430	US 93160068	A	19931130	199623	
			US 95413192	A	19950327		
NO 9602190	A	19960702	WO 94US10690	A	19940921	199636	
			NO 962190	A	19960529		
FI 9602262	A	19960715	WO 94US10690	A	19940921	199641	
			FI 962262	A	19960530		
EP 732004	A1	19960918	EP 94929855	A	19940921	199642	
			WO 94US10690	A	19940921		
JP 9505963	W	19970610	WO 94US10690	A	19940921	199733	
			JP 95515594	A	19940921		
BR 9408193	A	19970826	BR 948193	A	19940921	199740	
			WO 94US10690	A	19940921		
AU 683308	B	19971106	AU 9478767	A	19940921	199802	
CN 1136370	A	19961120	CN 94194293	A	19940921	199804	
EP 732004	B1	19980429	EP 94929855	A	19940921	199821	
			WO 94US10690	A	19940921		
DE 69409968	E	19980604	DE 609968	A	19940921	199828	
			EP 94929855	A	19940921		
			WO 94US10690	A	19940921		
ES 2118442	T3	19980916	EP 94929855	A	19940921	199848	
TW 340271	A	19980911	TW 96105196	A	19960501	199902	N
CA 2175800	C	19990601	CA 2175800	A	19940921	199940	
			WO 94US10690	A	19940921		
IL 118010	A	20000831	IL 118010	A	19960423	200058	N
RU 2155439	C2	20000827	WO 94US10690	A	19940921	200103	
			RU 96114947	A	19940921		
SG 77572	A1	20010116	SG 969345	A	19960423	200115	N

Priority Applications (No Type Date): US 93160068 A 19931130; US 95413192 A 19950327; TW 96105196 A 19960501; IL 118010 A 19960423; SG 969345 A 19960423

Cited Patents: 01Jnl.Ref; EP 212760; US 3808545; US 5075634

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9515612	A1	E	21	H03F-001/02	

Designated States (National): AM AT AU BB BG BR BY CA CH CN CZ DE DK EE ES FI GB GE HU JP KE KG KP KR KZ LK LR LT LU LV MD MG MN MW NL NO NZ PL PT RO RU SD SE SI SK TJ TT UA UZ VN

Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT KE LU MC MW NL OA PT SD SE SZ

AU 9478767	A	H03F-001/02	Based on patent WO 9515612
US 5513094	A	10 H02M-003/24	Cont of application US 93160068
NO 9602190	A	H03F-001/02	
FI 9602262	A	H03F-000/00	
EP 732004	A1 E	21 H03F-001/02	Based on patent WO 9515612
Designated States (Regional): DE DK ES FR IT NL SE			
JP 9505963	W	21 H03F-001/02	Based on patent WO 9515612
BR 9408193	A	H03F-001/02	Based on patent WO 9515612
AU 683308	B	H03F-001/02	Previous Publ. patent AU 9478767 Based on patent WO 9515612
CN 1136370	A	H03F-001/02	
EP 732004	B1 E	12 H03F-001/02	Based on patent WO 9515612
Designated States (Regional): DE DK ES FR IT NL SE			
DE 69409968	E	H03F-001/02	Based on patent EP 732004 Based on patent WO 9515612
ES 2118442	T3	H03F-001/02	Based on patent EP 732004
TW 340271	A	H02J-003/12	
CA 2175800	C E	H03F-001/02	Based on patent WO 9515612
IL 118010	A	H03F-003/217	
RU 2155439	C2	H03F-001/02	Based on patent WO 9515612
SG 77572	A1	G05F-001/59	

Abstract (Basic): WO 9515612 A

The power converter includes a bridged power amplifier powered from a single input power source through a number of parallel connected pulse width modulated switch-mode power converters (202). The converters are modulated by reference signals which operate in time alternation such that in any conversion cycle there exists a number of modulating waveforms which are identical except for their time delays and which are evenly spaced in time over a single conversion cycle.

A feedback control amplifier compares the voltage output of the parallel connected converters through the magnitude of the amplifiers required supply voltage and drives the modulating \*\*\*components\*\*\* of the \*\*\*circuit\*\*\* to \*\*\*control\*\*\* the switching duty cycle of each of the individual converters.

USE/ADVANTAGE - Provides highly efficient fast precision amplification system capable of producing tens of kilowatts of power at reasonable cost.

Dwg.2/5

Abstract (Equivalent): US 5513094 A

An amplifier power supply circuit comprising a power amplifier having a power input, a plurality of pulse width modulated switch-mode power converter means connected in parallel and adapted for connection to a DC power supply, each converter means for tracking the power demand for said amplifier, all said converter means collectively for outputting current from said power supply to said amplifier power input, each converter means including an operating frequency which is phase locked to a sampled data input having a data rate, a pulse width modulated controller means for sensing the power input demands of said amplifier and in response thereto producing a pulse width modulated switch drive signal for each said converter means, said controller means including a free-running oscillator and phase lock circuitry including a resonate circuit stimulated by a data rate clock pulse for synchronizing said oscillator in producing each said pulse width modulated switch drive signal.

Dwg.2/5

Title Terms: SWITCH; MODE; POWER; SUPPLY; BRIDGE; LINEAR; AMPLIFY; PULSE;

WIDTH; MODULATE; SWITCH; MODE; POWER; CONVERTER; PARALLEL; CONNECT; DC;  
POWER; SUPPLY; TRACK; POWER; DEMAND

Derwent Class: S05; U21; U24

International Patent Class (Main): G05F-001/59; H02J-003/12; H02M-003/24;  
H03F-000/00; H03F-001/02; H03F-003/217

International Patent Class (Additional): G05F-001/40; G05F-001/66;  
H02M-003/02; H02M-003/158; H03F-003/20; H03K-007/08

File Segment: EPI

Manual Codes (EPI/S-X): \*\*\*S05-D02B1\*\*\*; U21-B01A; U21-B05C; U24-D01A1;  
U24-D02B3; U24-E02B2A; U24-G01B; U24-G02F4

---

16/9/2 (Item 2 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

009860700 \*\*Image available\*\*

WPI Acc No: 1994-140557/199417

XRPX Acc No: N94-110748

[REDACTED] MRI appts magnetic field generator - has control unit generating signal  
to indicate required current for compensating channel crosstalk

Patent Assignee: TOSHIBA KK (TOKE )

Inventor: YOKOI M

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 6086766	A	19940329	JP 93178348	A	19930719	199417 B
US 5530356	A	19960625	US 9393783	A	19930719	199631
			US 95543743	A	19951016	

Priority Applications (No Type Date): JP 92191207 A 19920720

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
-----------	------	-----	----	----------	--------------

JP 6086766	A	12		A61B-005/055	
------------	---	----	--	--------------	--

US 5530356	A	17		G01R-033/28	Cont of application US 9393783
------------	---	----	--	-------------	--------------------------------

Abstract (Basic): JP 6086766 A

Magnetic field generator for MRI appts. comprises a control unit to generate a control signal to indicate desired current to be fed to a multi-channel coil unit and compensation unit to compensate the crosstalk between channels of the coil unit.

USE - For avoiding crosstalk between coils.

Dwg.1/11

Abstract (Equivalent): US 5530356 A

An apparatus for generating magnetic fields for a nuclear magnetic resonance imaging, comprising:.

coil means having a plurality of channels for generating magnetic fields;

power source means for supplying currents to drive the coil means;  
controller means for generating control signals indicating desired currents to be supplied from the power source means to the coil means in an absence of cross-talks among said plurality of channels of the coil means;

compensation circuit for compensating for the cross-talks among said plurality of channels of the coil means by supplying the power source means with cross-talk compensated control signals for

controlling the currents to be supplied from the power source means to the coil means, the cross-talk compensated control signals being obtained by adding the control signals generated by the control means with cross-talk compensation \*\*\*component\*\*\* signals derived according to predetermined cross-talk characteristics of said plurality of channels of the coil means;

said compensation circuit including a compensation \*\*\*component\*\*\* generation circuit for generating the cross-talk compensation \*\*\*component\*\*\* signals by obtaining an inversion of cross-talk \*\*\*component\*\*\* waveforms for the cross-talks among said plurality of channels of the coil means measured in advance;

an addition \*\*\*circuit\*\*\* for adding the \*\*\*control\*\*\* signals generated by the control means with the cross-talk compensation \*\*\*component\*\*\* signals generated by the compensation \*\*\*component\*\*\* generation circuit; said compensation \*\*\*component\*\*\* generation circuit for each one of said plurality of channels includes a unit compensation circuit for each remaining channel other than said each one of said plurality of channels which constructs each cross-talk compensation signal for the cross-talk due to said each remaining channel; and

said unit compensation circuit for said each remaining channel includes:

a first gain, \*\*\*circuit\*\*\* for applying a gain \*\*\*control\*\*\* operation on one of the control signals for said each remaining channel;

an exponential circuit for applying an exponential operation on an output of the first gain circuit;

a differentiation circuit for differentiating an output of the exponential circuit;

a decay circuit for applying a decay operation on an output of the differentiation circuit;

an inversion circuit for inverting an output of the decay circuit; and

a second gain \*\*\*circuit\*\*\* for applying another gain \*\*\*control\*\*\* operation on said one of the control signals for said each remaining channel, where a sum of an output of the inversion circuit and an output of the second gain circuit constitutes said each cross-talk compensation \*\*\*component\*\*\* signal for said each remaining channel.

Dwg.3/11

Title Terms: MRI; APPARATUS; MAGNETIC; FIELD; GENERATOR; CONTROL; UNIT; GENERATE; SIGNAL; INDICATE; REQUIRE; CURRENT; COMPENSATE; CHANNEL; CROSS-TALK

Derwent Class: P31; S01; S03; S05; V02

International Patent Class (Main): A61B-005/055; G01R-033/28

International Patent Class (Additional): G01N-033/38

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): S01-E02A; S01-H05; \*\*\*S03-E07A\*\*\*; \*\*\*S05-D02B1\*\*\*; V02-F01G

---

16/9/3 (Item 3 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

009800784 \*\*Image available\*\*

WPI Acc No: 1994-080638/199410

XRPX Acc No: N94-062992

Radio frequency earthing switch for magnetic resonance imager - uses PCB  
and includes variable tuning capacitor

Patent Assignee: UNIV CALIFORNIA (REGC )

Inventor: ARAKAWA M

Number of Countries: 003 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
NL 9301319	A	19940216	NL 931319	A	19930728	199410 B
DE 4325368	A1	19940310	DE 4325368	A	19930728	199411
US 5371466	A	19941206	US 92921107	A	19920729	199503
US 5376885	A	19941227	US 92921107	A	19920729	199506
			US 94229227	A	19940418	

Priority Applications (No Type Date): US 92921107 A 19920729

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
NL 9301319	A	25	G01R-033/36		
DE 4325368	A1	13	H04B-015/00		
US 5371466	A	11	G01V-003/00		
US 5376885	A	10	G01V-003/00	Div ex application	US 92921107

Abstract (Basic): NL 9301319 A

Inside the magnetic gradient coil (10) of the imager is a radio frequency coil structure (12). The RF coil structure is connected via the earthing switch (100) and a transmission line (14) to the radio frequency transmitter and receiver (16).

The computerised \*\*\*control\*\*\* \*\*\*circuit\*\*\* (18) channels the received signal to the magnetic resonance image processor (20) which drives the visual display (22). The radio frequency earth switch (100) consists of a series inductance in parallel with a fixed capacitor and a variable capacitor.

USE/ADVANTAGE - Filters out specific frequencies of interference.  
Is compact and efficient.

Dwg.3,4/8

Abstract (Equivalent): US 5376885 A

A printed circuit board has printed circuit conductors on both sides of an insulating substrate. A coiled coaxial cable has an outer conductor at each end affixed to two respective printed circuit conductors on a first side of the printed circuit board.

Two further printed circuit conductors are disposed on the second side of the printed circuit board and connected to the two printed conductors disposed on the first side of the printed circuit board. At least one capacitor is disposed and connected between the printed conductors on the second side of the printed circuit board.

USE - Coaxial cable RFI choke assembly for reducing transmission, via an outer coaxial cable conductor, of RF signals having a predetermined range of frequencies. The choke assembly is esp. useful in coupling RF coils of MRI systems to MRI RF signal processors.

Dwg.5A/8

US 5371466 A

The choke assembly comprises a printed circuit board and a first coaxial cable RFI choke mounted on the printed circuit board and having a coiled coaxial cable with an outer conductor connected in parallel via printed circuit conductors across a first variable tuning capacitor. A second coaxial cable RFI choke is mounted on the printed circuit board and has a coiled coaxial cable with an outer conductor

connected in parallel via printed circuit conductors across a second variable tuning capacitor.

At least one neutralising capacitor is connected between the coiled coaxial cables for reducing RF coupling between. At least one \*\*\*component\*\*\* of each RFI choke is disposed on both sides of the printed circuit board. The coiled coaxial cables pref. comprise semi-rigid coaxial cable.

USE - Coaxial cable RFI choke assembly for reducing transmission, via an outer coaxial cable conductor, of spurious RF signals having predetermined frequency.

Dwg.8A/8

Title Terms: RADIO; FREQUENCY; EARTH; SWITCH; MAGNETIC; RESONANCE; IMAGE; PCB; VARIABLE; TUNE; CAPACITOR

Index Terms/Additional Words: MRI

Derwent Class: S01; S03; S05; U25

International Patent Class (Main): G01R-033/36; G01V-003/00; H04B-015/00

International Patent Class (Additional): G01R-033/32; H01R-009/09; H01R-013/658; H01R-013/719; H03H-001/00; H05K-001/18

File Segment: EPI

Manual Codes (EPI/S-X): S01-E02A; S01-H05; \*\*\*S03-E07A\*\*\*; \*\*\*S05-D02B1\*\*\*; S05-D02B2; U25-E02; U25-E05B; U25-E05D; U25-E05H

---

16/9/4 (Item 4 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2001 Derwent Info Ltd. All rts. reserv.

008988155 \*\*Image available\*\*

WPI Acc No: 1992-115423/199215

XRPX Acc No: N92-086248

Double surface coil for nuclear spin resonance scanner - uses \*\*\*control\*\*\* \*\*\*circuit\*\*\* with only small number of \*\*\*components\*\*\*

Patent Assignee: SIEMENS AG (SIEI )

Inventor: DECKE G; POTTHAST A; REQUARDT H

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 4030877	A	19920402	DE 4030877	A	19900929	199215 B
US 5202634	A	19930413	US 91763641	A	19910923	199317

Priority Applications (No Type Date): DE 4030877 A 19900929

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
DE 4030877	A		7		
US 5202634	A		8	G01R-033/20	

Abstract (Basic): DE 4030877 A

A double surface coil for a nuclear spin resonance scanner has two single coils (L<sub>1</sub>, L<sub>2</sub>) that selectively can be connected through interface (A) to a transmitter/receiver network (16). A primary switch (S<sub>11</sub>, S<sub>12</sub>) is added to the single coil (L<sub>1</sub>, L<sub>2</sub>) on each side of the common link (St).

Each of the primary switches (S<sub>11</sub>, S<sub>12</sub>) is connected to interface (A). In this manner double surface coils can be switched to operate in any desired mode using a \*\*\*control\*\*\* \*\*\*circuit\*\*\* with a minimum number of \*\*\*components\*\*\*.

USE - Mammographic nuclear spin resonance scanner.

Dwg.2/5

Title Terms: DOUBLE; SURFACE; COIL; NUCLEAR; SPIN; RESONANCE; SCAN; CONTROL  
; CIRCUIT; NUMBER; \*\*\*COMPONENT\*\*\*

Index Terms/Additional Words: MAMMOGRAPHY

Derwent Class: P31; S01; S03; S05; V02

International Patent Class (Main): G01R-033/20

International Patent Class (Additional): A61B-006/00; G01N-024/08;  
G01R-033/36; H03J-005/00

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): S01-E02A; S01-H05; S03-E07; \*\*\*S05-D02B1\*\*\*;  
V02-F01G